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XXVIII. AFFECTIVE SENSITIVENESS TO COLORS, TONE INTERVALS, AND ARTICULATE SOUNDS

By MARGARET BABBITT, MARJORY WOODS, and M. F. WASHBURN

In Number XXIII of the Minor Studies from this laboratory (this JOURNAL, volume 24, pages 583-585), it was suggested that a numerical value might be obtained which should represent an individual trait hitherto not investigated as such, namely, the degree of affective sensitiveness to certain classes of impressions. By affective sensitiveness was meant the tendency to derive extreme degrees of pleasantness or unpleasantness from a class of stimuli. Evidently affective sensitiveness may be either general, in other words a tendency to have strong affective reactions to all kinds of stimuli, or specialized, that is, a tendency to be strongly stirred affectively by one kind of impression but not by others. The numerical measure which was suggested for affective sensitiveness was as follows: The observer was required to express the pleasantness or unpleasantness of a number of stimuli belonging to a certain class by the use of the numbers 1 to 7; the ratio was then found between the number of '4' or indifference judgments to the number of '1' or very unpleasant plus the number of '7' or very pleasant judgments. This ratio evidently varied inversely with the degree of affective sensitiveness, and is trustworthy so long as neither the numerator nor the denominator is zero.

In the study above referred to, affective sensitiveness to colors and articulate sounds was investigated. In the experiments described in the present study we used three kinds of material; small pieces of the Bradley colored papers (2.9 cm. square) on a white ground; nonsense syllables consisting of an initial vowel and a final consonant; and musical intervals and chords struck on the piano. The object in using three kinds of stimuli was to study further the relations between general and special affective sensibility; to see, for example, whether the existence of special affective sensibility to auditory impressions would be indicated by a higher correlation between sensibility to tones and sensibility to articulate sounds than between either and colors. There were ninety colors (the full Bradley set), ninety syllables, and thirty intervals and chords. The latter comprised all the intervals within the octave, and a number of three toned chords, consonant and dissonant. Since if the musical stimuli had been given one immediately after the other the sequence would have affected their pleasantness, the order of presentation was as follows. First, three colors were laid one after the other on a white ground, and the observer was asked to judge their pleasantness or unpleasantness using the numbers 1 to 7. Then one of the intervals or chords was struck on the piano, and the observer recorded her judgment of its affective value in the same way. Then three syllables were pronounced, with equal force and distinctness, and the observer's judgment of the pleasantness or unpleasantness of each was recorded. The proceeding was continued until judgments had been made of all the colors, tones, and syllables. The same order was used for the individual colors, tones, and syllables with each observer.

There were ninety-seven observers, and the index of affective sensitiveness was calculated for colors, tones, and syllables in the case of each. Since some of the indexes had no finite value owing to the

fact that the observers either made no indifference judgments or no judgments of extreme pleasantness or unpleasantness, so that the numerator or denominator of the ratio was zero, it was not possible to get averages. The observers were arranged in order of affective sensitiveness to each kind of impression, those who made no indifference judgments standing at the head of the list in the order of the number of extreme judgments they made, as the most sensitive; and those who made no extreme judgments standing at the bottom in the inverse order of the number of indifference judgments they made, as the least sensitive. This arrangement is rather rough, but may serve where the number of observers is so large. Pearson rank-difference coefficients of correlation could then be found.

The following results appeared. First, the highest correlation, 36 per cent., existed between affective sensibility to colors and affective sensibility to syllables; that is, where tones were left out. The correlation between syllables and tones was 31 per cent., and that between tones and colors was the lowest, 24 per cent. It thus looks as if there exists a specialized affective sensitiveness to tones, which is responsible for a lower degree of correlation between sensitiveness to tones and that to other kinds of impression. Considering the special character of musical ability this is what we should expect. It was not possible to show, however, that the observers who were particularly sensitive to the affective values of musical intervals and chords were the most musically gifted, nor that those who were specially insensitive had 'no ear,' so far as their own testimony went; no tests were made. The matter was complicated by the fact that the musical observers had often studied harmony, and a chord which the naïve observer might have pronounced very unpleasant was to them 'interesting' by virtue of its significance for resolution. It would also appear from our indexes that there exists a slight degree of special affective sensitiveness to auditory impressions as such, which is responsible for the higher correlation between tones and syllables as compared with that between tones and colors.

Secondly, our results show that affective sensitiveness to tones is greater than that to colors, but only slightly, and that affective sensitiveness to articulate sounds is markedly less than that to either tones or colors. While it was not possible to average the indexes of affective sensitiveness, this conclusion may be based on the following figures. The number of indexes below 1 in value, indicating high and fairly high affective sensitiveness, was for tones 64, for colors 60, and for syllables only 29. The number of observers who never made a judgment of indifference was for tones, 10, for syllables 1, for colors, 1. The number of observers who never made a judgment of either extreme pleasantness or extreme unpleasantness was for tones, 0, for colors, 0, and for syllables, 6.

Finally, our results tend to indicate that general indifference is a more marked phenomenon than general affective sensitiveness. The lists of the first thirty observers as regards affective sensitiveness to each of the three classes of stimuli contain nine names that are common to all three lists (33 per cent.), representing those observers whose affective sensitiveness was general, who tended to be strongly affected, pleasantly or unpleasantly, by all the classes of stimuli. The lists of the last thirty observers as regards affective sensitiveness to each of the three kinds of stimuli contain thirteen names which are common to all three lists (43 per cent.), representing those observers who were markedly indifferent to all kinds of stimuli used. If this excess

of general indifference over general sensitiveness should prove to be a universal law, it might well be due to a failure on the part of a certain number of observers to give adequate attention to the stimuli, which would result not only in indifference judgments but in the suppression of whatever special influences might otherwise be exerted by special classes of stimuli.

XXIX. THE INFLUENCE OF FATIGUE ON AFFECTIVE SENSITIVENESS TO COLORS

By HARRIET ROBBINS, DOROTHY SMITH, and M. F. WASHBURN

In Minor Study Number XIV from the Vassar laboratory (this JOURNAL, volume 22, pp. 112-114), there were reported some experiments tending to show that colors are judged to be less agreeable at the end of a long series of such judgments than at the beginning; that is, that the fatigue induced by a long series of judgments on the affective values of colors lowers their affective value. Our object in the present study was to see how fatigue thus brought about would influence the affective sensitiveness of the observer to the colors; that is, not his tendency to find the colors pleasant or unpleasant, but his tendency to make judgments of an extreme rather than a moderate degree of either pleasantness or unpleasantness. Our method was somewhat more exact than that used in the former study.

The ninety colors of the Bradley series, represented by pieces of the colored papers 2.9 cm. square, were divided into four sets, designated as A, B, C, and D. Sets A and C were of twenty-two colors each; sets B and D of twenty-three colors each. The colors were chosen in random order to make the sets, but the pieces of paper were then numbered on the back so that the colors of a set should always be presented in the same order. Each piece of colored paper was laid by itself on a white background before the observer, who was asked to judge its pleasantness or unpleasantness using the numbers 1 to 7 in the usual way. The entire ninety colors (four sets) were presented thus twice over without pause, making 180 judgments of affective value at a sitting. The set that was used first at a sitting was also used last at the same sitting: thus, one order was: A, B, C, D, B, C, D, A; another, B, C, D, A, C, D, A, B. The observer was asked at the close of a sitting whether she felt tired or bored. For the series which had been presented at the beginning of the sitting and again at the end the following numerical values were calculated; the average affective value of the colors on their first presentation and on their second presentation (that is, the numbers obtained by averaging the numerical values assigned to the individual colors of the set), and secondly, the coefficients of affective sensitiveness for the colors on their first and on their second presentation (that is, the number of judgments '4,' or indifferent, divided by the sum of the numbers of '1,' very unpleasant, judgments and '7,' very pleasant judgments.)

There were 82 observers, all young women and undergraduate students. We were rather surprised to find that only 31 per cent. of them declared themselves bored at the end of the long series of 180 judgments. Five of the 82 observers said that they became more interested towards the end than they had been at the beginning.